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RAW MATERIALS

97 Superfast rice

Japanese farmers may be the first to colonise the moon and grow a superfast breed of rice there for their food self-sufficiency. Government-backed Japanese agriculture scientists have developed a rice that can be harvested in just one hundred days from the day of sowing. Normally it takes 160 days for a fast-breed rice to grow.

The Institute of Environment Science of the Science and Technology Ministry grew the superfast rice at its "closed-environment experimental" facility in Aomori prefecture, northern Japan. The rice growing experiment is part of a programme to develop technology for joint international activities on the surface of moon where manned colonies are to be built. The idea is to grow food for the "inhabitants" of those bases on the moon, according to Mr. Koji Otsubo of the Environmental Simulation Department of the Aomori institute.

The cultivation facility is equipped with powerful sodium lamps and other devices that artificially produce and control environment. Scientists there can enhance the efficiency of plant photo-synthesis by controlling the strength and duration of light, room temperature and atmospheric density of carbon dioxide.

Researchers obtain best results when they adjust the hours of artificial sunlight to the stages of growth of the plant, set the room temperature about four degree Celsius higher than the normal outdoor temperature as the plant start developing ears. Mr. Otsubo said. Rice seedlings sown on May 30 last year grew ears of grain about 80 days later and matured by early September. Yield per sq. m was 600 gm and taste of the rice was as good as field-grown grain, he said.

US space agency, NASA. is also carrying out similar experiment. while Russian cosmonauts have experimented with wheat cultivation on their Mir space station.

{Business Line, 26 February 1998, 13}

98 Genetically modified potato

Oxford University scientists have discovered how to modify potatoes genetically to produce ultra-low-fat chips. The breakthrough hinges on the balance of water and starch in potatoes. The higher the water content, the greater the amount of fat absorbed during the frying process.

But. Prof. Chris Leaver and Dr.Steven Hill have found a way of reducing water levels in potatoes so the chips soak up very little fat. At the same time, the starch content rises, improving the nutritional value of the food. Although the work is at an early stage, the implications for the production of chips - and the diet industry could be enormous. Crisps are currently produced in "diet" form by using less or very light oil, but the new technique could reduce the fat content radically.

The work of the scientists involved looking at an enzyme called NAD-malic, which affects the rate of energy production.

While Prof. Leaver and Dr. Hill managed to reduce the levels of the enzyme, this had no noticeable effect on the vegetable's respiration. It did, though, have a significant effect on the potato's starch content - the lower the enzyme the higher the starch.

Starch is the form in which carbohydrates are stored in the body, making it the largest single energy source in the human diet. This means the discovery has huge commercial potential if the genetic manipulation can be extended to other starch crops such as corn, rice and wheat.

Prof. Leaver said there were still a number of questions which had to be answered before crops could be considered for commercial use. So far, all the potatoes tested have shown changes in their starch levels.
[The Hindu, 6 January 1998, 17]

STORAGE AND INFESTATION CONTROL

99 Grain storage technology

A low cost rural storage technology has been developed by scientists at the Indian Agriculture Research Institute (IARI) for food grains drastically affected by humidity and high temperature in the coastal districts of Orissa.

The simple storage facility called "Pusa Kothar" consists of air tight mud brick compartments which retain low oxygen levels because of the 1000g thick plastic sheets embedded in between two mud walls.

The grain filling inlet and emptying outlet are made reasonably airtight to restrict loss of germination due to humid and high thermal environment at all stages of crop production and post-harvest.

"The process is most effective in dry grain specially below 10 per cent level of moisture content", a senior scientist at the division of entomology at IARI, Dr. T D Yadav told PTI.
[PTI Science Service, 17(1), 1998, 7]

100 Keeping food fresh by "electrocuting" microbes

A new food preservation technology without the use of radiation has been developed by British scientists. The process, developed by scientists at Dentron Ltd., uses electrically-charged air particles to kill the microbes responsible for food decay and obviates the use of preservatives, reports British Commercial News. With increasing public demand for high-quality food at reasonable prices, the technology finds a way to keep perishables fresh and in peak condition as long as possible from farm to the supermarket shelf without affecting their flavour, nutritional value or safety.

Tests on slices of chicken artificially contaminated with *Salmonella* proved the high efficiency of the technique and its capacity to reduce appreciably the risk of food poisoning. The process lengthens the shelf-life of food and leave its taste and texture unaltered. Potential applications extend

from cooked and uncooked meats to fish, vegetables, fruits and even spices. Some types of food packaging can also be sterilized by the process.

The air ions that immerse the object requiring sterilizing are formed by a high voltage generator and are discharged from a conductor maintained at a high electric potential with respect to earth. Negative ions formed at the point are repelled by the negative potential at that point, and create an "ion wind" that is attracted towards bodies with a relative positive potential and conversely in the case of positive ion.

The destruction of gram-negative and gram-positive bacteria, yeast and moulds is does-dependent and is affected by several parameters including exposure to time, distance from the ion source, charge of ions that can be changed by reversing the polarity of the electrodes, and the number of ions per unit area making impact on the surface to be treated.
{PTI Science Service 17(6), 1998, 15}

101 Gentle drying with CO_2

Keeping the individual taste and color of fresh or dried foodstuffs is one of the main advantages of the new Heinen gentle drying process. By using a patented CO_2 drying system, products like meat, fish, crustaceans, fruits, vegetables, mushrooms and spices still maintain their particular characteristics.

The natural taste and color, individual aroma and cell structure of the raw material is maintained, and natural texture is conserved after rehydration. There is no smell pollution during production and a low bug count in the final product.

"By using carbon dioxide as circulation contact gas, fresh goods keep their quality," said Michaela Teschner of Heinen. "The carbon dioxide is used as bacteriostatic gas and ensures a very good drying process. ...And the price for this new system, compared with the freeze-drying process, is significantly lower".
{Food Engineering International, October 1997, 38}

PROCESSES

102 Garlic bread

Garlic bread, made with garlic butter, is a fast food mainstay. But garlic-flavoured bread - not to mention onion - or chive-flavoured - is a rarity. This, according to Ernst Guy and Jon Soper of Tastemaker in Cincinnati, is because extracts from the allium family damage the quality of bread. Although doughs containing garlic or onion extracts are flexible and easy to handle, the cooked products tend to be tough, poorly risen and go stale very quickly.

Guy and Soper's solution (International patent application WO96/32017) is to encapsulate flavoured oils from allium plants inside a protein coat. The first stage in the process is to make a colloid of gelatin and sodium carboxymethylcellulose in water, then add the allium oils. After mixing, the colloid is subjected to a process called coacervation, where extra water is added, or the pH adjusted, to make the colloidal materials cluster around the oil droplets.

Glutaraldehyde is then added, which forms cross-links between the gelatin and the cellulose compound, forming a solid coat around the oil.

Freeze-drying this mixture gives a stable powder that can be added to flour, say the researchers. The coating is heat-stable, so the oils do not leak out and can't affect the dough quality while cooking. However, the capsules are fracturable, so when the bread is sliced or chewed, the oils - and their flavour - are released.
{Chemistry & Industry, 2 March 1998, 160}

103 Sugars from cellulosic materials

An economically viable method (United States Patent US 5 562 777) for producing sugars from biomass containing cellulose and hemicellulose. Celluloses and hemicelluloses are initially decrystallized and then subjected to hydrolysis with a concentrated acid to produce a hydrolysate containing both sugars and acid. Silica present in the biomass can then be removed from the hydrolysate for further processing. The remaining solids are subjected to a second decrystallization and hydrolysation to optimize sugar yields.

Methods for separating the sugars from the acid in the hydrolysate, and for the simultaneous fermentation of hexose and pentose sugars in the resulting sugar stream are described.
{Trends in Food Science & Technology, November 1997, 384}

104 Low-fouling milk identification

A relationship has been established (PCT International Patent Application WO 96/36240 A1) between the fouling rate of milk during processing into milk powder products and the β- -lactoglobulin phenotype of the cow whose milk is being processed. Milk from the β- -lactoglobulin BB phenotype cows has a much lower fouling rate than that from the β- -lactoglobulin AA phenotype cows.

A method is described for testing milk for the presence of non-fouling the β- -lactoglobulin variants and recovering and keeping that milk separate from the fouling-variant-containing milk. The non-fouling variant or blends of ≥ 30%(w/w) of the non-fouling variant milk is further processed into milk powder products. This method also provides a means of selecting a dairy herd that has only β- -lactoglobulin non-fouling variant phenotype cows.
{Trends in Food Science & Technology, November 1997, 383}

105 Coffee aroma emulsion

An aroma-containing emulsion (United States Patent 5 576 044) for use in soluble coffee powders. The emulsion contains hydrolysed coffee oil and a coffee aroma preparation, and is mixed with coffee powders to produce a soluble coffee product. Upon the addition of water, an oil-in-water emulsion is formed, providing a burst of coffee aroma.
{Trends in Food Science & Technology, December 1997, 425}

106 Flavour carrier

Methods to add a flavour (United States Patent US 5 587 196) to a food by incorporating the flavour into a lipid phase of the food by means of a fat-substitute carrier; flavour can be added to both reduced-fat and full-fat foods. The addition of flavour to the fat-substitute carrier, in particular via volatilization, produces excellent characteristics such as reduced mouthcoating and a flavour that is equivalent to that of a comparable full-fat food, with the least amount of added triacylglycerol. Compositions are also presented.
{Trends in Food Science & Technology, November 1997, 383}

107 Textured protein meat substitutes

A method (United States Patent US 5 565 234) for producing a protein based low-calorie food that has a meat-like texture and mouthfeel. A material consisting mainly of protein and water is supplied to an extruder through a supply port and mixed by screws before extrusion from an extruder port. The extrusion port is provided with a die that includes a plate with holes. The die has a cooling mechanism for cooling the extruded mixture. The extruded protein material is then heated and compression moulded by a pressing machine to form the product.
{Trends in Food Science & Technology, November 1997, 384}

108 Ca soak for firmer fruit

Pretreatment method (United States Patent US 5 576 046) for fruit that causes the pectins in the fruit to gel, preventing the separation of the juice from the fruit during subsequent processing. The method involves the fresh fruit being soaked in calcium solutions for extended periods (2-6 weeks).
{Trends in Food Science & Technology. December 1997, 426}

109 Pectins for foam stabilization

A method (Netherlands Patent Application NL 94 01 273) for obtaining pectins and their application for the foam stabilization of drinks with a foam head (e.g. beer, especially pils). The pectin does not have an adverse effect on beer flavour. Preferably, the pectins are obtained from hop cones or stalks.
{Trends in Food Science & Technology, December 1997, 425}

110 Tea for tumours

To prevent oxidation (European patent application 0819433) what's needed is some sort of antioxidant - and tea is rich in antioxidants. Searching through the compounds available from tea leaves, the researchers from the Chinese Academy of Medical Sciences in Beijing and Mitsui Norin in Tokyo found that two species were particularly effective. These are catechins, a group of polyphenols and theaflavins which are simply dimers of catechins. These compounds are abundant in both black and green tea, and can be extracted using simple solvents such as low-grade alcohol, acetone or even water.

The team says that catechins and theaflavins are especially effective at preventing the oxidation of 'anti-metabolite' drugs, anti-cancer agents which prevent the metabolism of purine and pyrimidine bases, thereby stopping

DNA replication. Two of these antimetabolite drugs, cytarabarine and metho-trexate, are particularly responsive. The catechins and theaflavins are most effective when mixed in a roughly one-to-one ratio with the drug in an oral formulation, the team says. In tests, mice with leukaemia that were treated with the drug/antitoxidant mixture survived at least twice as long as those given the drug alone.
{Chemistry & Industry, 2 February 1998, 82}

111 New technology to keep fish fresher

Marine Exporters in the country who have been facing serious problems in preserving wet fish for more than three days can now overcome those problems.

Ganesh Benzoplast, a Mumbai-based manufacturer of food preservatives, has developed a process that helps preserve fish for longer duration.

By adding its product, Preserfish, to water before it is converted into ice for being used in preservation of fish, cuts down and even kills the bacterial population, and thus helps in keeping the fish in tact for nearly 15 days, according to a press release issued by the company.

It said that mere using of ice would at best retards the growth of bacteria for three to four days but not help reduce the bacterial load attacking fresh fish. The new product mixed with ice, however, would destroy harmful organisms such as *E.coli* and *Salmonella* in sea foods, if used in prescribed quantities. The company claimed that the product has been tested in various reputed government and private laboratories, and its efficacy has also been proved. Preserfish is produced from a variety of non-toxic food additives that are widely used the world over for preserving pharmaceutical and food products, it added.
{The Economic Times, 18 February 1998, 19}

112 Potato storage

Potatoes and their relatives are a staple diet for a large part of the world, but because they're seasonal, they have to be stored for a large portion of the year. This is not as easy as it sounds - store whole roots and many of them will rot. They freeze well, but this requires electricity; while dried potatoes can only be reconstituted as mash, which is rather monotonous.

What's needed, explains Madrid-based researcher Francisco Camacho Juarez, (European patent application 0815734) is some way of drying potato (or sweet potato, or manioc) so that, when reconstituted, it can be used as if it were fresh. The problem here is the constituents of tubers, he explains. On average; they are three-quarters water, one quarter starch. Starch consists of two macromolecules - amylose and amylo pectin. When large pieces of fresh tubers are dried - which can only be done with hot air - the amylopectin caramelises and forms a skin on the surface, which stops water escaping. The result is that the spud doesn't dry; it cooks.

The solution to this, claims Camacho Juarez, is to partially break down the amylopectin with a mild oxidising agent such as sodium hydroxide, acetic acid or alcohol. The pectin isn't particularly resistant to

oxidation, so dilute solutions of oxidising agents will work, he says - up to 8% by volume is ideal.

Slices of peeled tuber are soaked in this solution for around half an hour, then allowed to drip dry, before being put through a drying oven where hot air is blown over and around the slices. The temperature profile inside the oven starts hot (around 180°C) and cools down at a rate determined by the thickness of the slices, says Camacho Juarez.

The result is a dry chunk of potato that, he claims, will keep for months without spoiling, and needs no extra equipment for safe storage. Reconstitution is simply a matter of soaking in water until the slices have the consistency of the fresh vegetable. And as an extra bonus, removing some of the starch also reduces the calorie content.
{Chemistry & Industry, 19 January 1998, 47}

BYPRODUCTS AND WASTE UTILIZATION

113 Palm-oil waste: a potential source of plastics

Malaysia is the world's leading producer of palm oil, but its palm-oil mills also generate about 20 million m.t./yr of effluent. Now, that waste could be converted into bioplastics through a process developed at University Putra Malaysia (Serdang, Selangor).

Normally, this effluent is biotreated by conversion into organic acids, which then break down into gases. The new process starts the same way, says Mohammed Ali Hassan, a scientist in the Dept. of Biotechnology, but the degradation is arrested before the acids decay into gases, and the acid-laden liquids are separated from the solids. Bacteria, of an undisclosed strain, are then mixed into and feed on the acids, accumulating up to 70 wt.% of polyhydroxy alkanoates (bioplastics) in their cells. After a week, the bacteria are killed by a solvent (e.g., chloroform), and the cell walls are physically broken down and filtered out. Finally, the solvent is evaporated, leaving the plastic behind.

Hassan estimates that the plastic could be produced for $1.50/kg, about twice the cost of commodity plastics. However, it can tolerate temperatures upto 140°C, so he expects it to be used in food applications, such as disposable cutlery and cups.
{Chemical Engineering, January 1998, 21}

114 Agro waste fuel briquetting plant

There is plenty of agricultural and forest residues such as groundnut shells, bagasse, castor shells, cotton stalks, mustard husk, coffee husk, pine needles, grasses, shrubs, saw dust, etc. which are not being utilised efficiently due to their lower density, high moisture and irregular sizes. Biomass fuel briquetting is an ideal solution to convert these waste materials into solid fuel briquettes which can replace coal and firewood in boilers and kilns. The process is simple and proven on numerous raw materials. Material is first chopped to size, dried, and ground to desired size before feeding the processed material to the press, where it is compressed into

solid round shaped logs. This is a binderless process. More than 100 units are already working in Punjab, Haryana, Rajasthan, Tamil Nadu, Gujurat, Karnataka, Andhra Pradesh and Uttar Pradesh.

For further information write to : Hi-Tech Agro Projects Pvt. Ltd. 123/124, 3rd Floor, Satya Niketan, New Delhi 110 021
{Industrial Products Finder, Annual 1997, 353}

EQUIPMENT AND MACHINERY

115 Granule filling machine

It is a nett weigh filter, in which a predetermined weight of the product is automatically weighed and then deposited into the empty containers/pouches. This machine is suitable for filling granular materials such as seeds, cereals, grains, tea, cashewnuts, extruded food-products. Being a nett weigh filter, it can fill into any type of pouch of rigid container. Several models are available to cover a filling range of 2 g to 5 kg. For most products, a filling speed of 10/15 fills per minute is guaranteed. The duplex models have two machines coupled together and therefore filling speed doubles. The product from the hopper is drawn out by two electric vibratory feeders and is fed into the weigh-pan suspended from a sensitive weigh beam. Both the coarse and dribble feeders feed the product fast until about 80% is filled at which point the coarse feeder stops. The rest of the product is fed as a dribble for greater accuracy until the final cut-off. Final cut-off takes place when the exact weight is received into the weigh-bucket. The weighed product is then automatically discharged from the weigh-bucket into the empty container. All the contact parts are made of SS 304 and the machine body is duly painted.

For further information contact : Automatic Devices, 105-A, Hind Saurashtra Industrial Estate, Andheri-Kurla Road, Mumbai 400 059.
{Industrial Products Finder, Annual 1997, 345}

116 Heavy duty mixer grinder

Lincon Heavy Duty Mixer Grinder has a six-litre capacity stainless steel jar, 1 HP, 1 Ph electric motor in aluminium cast body. It is also available in 9-litre capacity stainless steel jar, 2 HP, 3 Ph electric motor. Lincon heavy duty mixer grinder has been found extremely useful for R & D laboratories of various chemical units and also for handling medium size lots in regular production, restaurants, caterers, food processors, industrial canteens, and also for house wives operating their food enterprise from home.

For further information contact: The New India Electric & Trading Co. Hamam House, 38 Ambalal Doshi Marg, Mumbai 400 023.
{Industrial Products Finder, Annual 1997, 288}

117 Versatile mixers and blenders

The range of Sibus - Scott mixers and blenders can be used for solids/solids or solids/liquids mixing with such solids as powders, ingredients, flavourings, sweeteners, granules, flakes, and other bulk materials within the food processing

industries. Systems are available for normal and hygienic operation.

There are two main types offered by Sibus, batch and continuous mixers. They can be fitted with different internal configurations such as single or multi-ribbons, paddles, ploughs or combinations of each. The design is dependent on the product and ingredients being mixed or blended, and the need to heat or cool the product as it is being mixed and the retention time required.

The Sibus - Scott range of mixers achieve maximum efficiency and can handle large production volumes, ensure accurate mixing and are economical to run and maintain.
{Confectionery Production, September 1997, 16}

118 Instant coffee vending machine

Logicon introduces an advanced 8-option model of instant coffee vending machine. Unlike the conventional vending machines which primarily use pre-mixed ingredients of select multi-national brands, giving little choice to the customers, Selecta machine comes with a range of options. The advance 8-option model of the machine offers the choice of having tea/coffee black or white, with or without sugar and the like. The brand of ingredients can be changed according to the user's choice and there is no dependence on a pre-mix supplier. The local grocer would suffice as far as the ingredients are concerned. The individual ingredients can be set as per average taste requirements of the users and any change at any later point of time thereafter is possible. This vending machine need not be installed near a water source, because it comes with an inbuilt water storage tank. The machine also comes with a storage water level control which promptly starts a pump when the water level in the heating tank is below the required level.

For further information contact : Logicon Electronics India Pvt. Ltd. 208, Swastik Chambers, Sion-Trombay Road Chembur, Mumbai 400 071
{Industrial Products Finder, Annual 1997, 227}

119 Robot for measuring modified atmosphere in food industry

Abiss of France offers a robot that measures modified atmosphere in food industry. The Oxysampler is the most innovative yet simple analyser for MAP food. Simply drop the packs in the Oxysampler and get the % of residual O_2 or the % of CO_2 in seconds. Among the key features of the Oxysampler the safety in use is remarkable: in the Oxysampler the risk to prick one's finger with the needle has been eliminated. The Oxysampler is very reliable and robust: it has been designed to be capable to work on a 24-hour and 7-day schedule. The Oxysampler has proven its efficiency and high output in typical applications like crisps, snacks, cakes, ready-made salads and many other catered food.

For further information write to : Technovation, 4 Paramel, St.Cyril Road, Bandra, Mumbai 400 050.
{Industrial Products Finder, Annual 1997, 207}

120 Solar cooker

The Renewable Energy Research Centre of Sacred Heart College, Thevara,

has developed a high efficiency solar cooker. At the core of the solar cooker, which costs Rs.10,000, is a multi-purpose parabolic fibre concentrator dish embedded with high-quality mirror strips on the reflecting surface. This dish concentrates the solar energy falling on it to the focal point of the system where the cooking platform is located. A glass case covers the platform on four sides to trap infra-red radiation, thereby increasing the efficiency.

Utensils, with their exterior painted black, are used for cooking. A two litre cooker filled with water gave off steam within 15 minutes at the demonstration. The meat can be cooked in 20 minutes and vegetables within 12 minutes, putting the cooker far ahead of the conventional units which take much longer time. The heat generated by the unit averages around 400 degree Celsius. The main speciality of the unit is its unique tracking facility which enables it to rotate about two mutually perpendicular axes to track sun. The cooker, which is claimed to have a working life of 10 years with practically no maintenance, will save energy costs equalling its price in four years. The parabolic dish can be used as a dish antenna during night with required attachments. It can also be utilised for steam generation, hot air production and water distillation.

{Indian Express (Kochi), 28 January 1998, 3}

121 Dryfruit cutting machine

Twinkle Star offers the Krishna brand dryfruit cutting machine, which makes slices at 8 to 10 kg/hr and powder at 10 to 15 kg/hr from almond, cashewnuts, pista, chestnut, groundnut, black pepper, coriander seeds, etc. The light weight machine works on a 0.19 HP single phase electronic motor.

For more details write to : Twinkle Stars, Arya Sadan, 3 Dayanand Nagar, Opp. Sheth High School, Rajkot, Gujarat 360 002

{Chemical Products Finder January 1998, 14}

122 Hi-productivity food centrifuges

Bock Engineered Products Inc. USA, manufactures these centrifuges for rapid handling, simple operation and dependable performance under difficult service conditions. Durably constructed, their FP series of centrifuges are engineered to high output food processing operations. They are constructed on proven self-balancing design concept. Simple installation, foundation anchorages are not required. The centrifuges have the highest "G" force and can go up to 1,700 RPM. Each FP centrifuge is supplied with stainless steel lifting yoke, water-proof timer, basket floor dolly and grid liner. The company also manufactures Tornado automatic drying systems designed on their patented concept of rapidly rotating conveyors, capable of handling up to 6,000 lb of product per hour. This requires no manual labour for operation.

For more details write to : Impetus Incorporated, K 56/4, Sri Krishna Apts. Annanagar (East), Chennai 600 102

{Chemical Products Finder January 1998, 101}

123 Seed cleaning machines

Navnath Industries is specialised in the manufacture of seed cleaning machines such as destoners, precleaners, rotary drum graders, vibrators and sieving units. Destoners have 95 to 99% cleaning efficiency and are useful for cleaning wheat, jowar, rice, pulses, spices and oil seeds of any king. User areas include : hotels, restaurants, industrial canteens, departmental stores, dal mills, oil mills and rice mills.

For further information contact : Navnath Industries, Aditya Chambers, 1926 E Rajarampuri, 13th Lane Kolhapur, Maharashtra 416 008
{Industrial Products Finder, Annual 1997, 522}

124 Scanning spectrophotometer

Hach Co, USA, has introduced the DR/4000 UV-Vis spectrophotometer that makes analysis easier and convenient than before. It has innovative sample modules which are slid in and out for manual testing, multi-position carousels, pour-thru cells or sipper system. It has sophisticated software which can call up programs and wavelength with just a few key strokes - this instrument is driven by an advanced interactive user interface. It has more than 130 pre-programmed calibrations that are permanently stored in instrument's memory. A large graphical display which shows graphical representation of a wavelength scan. Peaks and valleys are available in tabular form. It has elegant chemistries which has fast accurate, convenient testing results when one uses the DR/4000 with Hach simplified methods and prepared reagents. It is available in ultra-violet and visible spectrum models. The resolution and accuracy is outstanding with specified wavelength measurements. The read out values can be chosen in concentration. ABS or % T. It can scan any wavelength range, perform time course operations, or use innovative standard addition function to check for accuracy. It is ideally suited for both routine, demanding applications in water treatment, industrial process, surface finishing, food beverage processing, pharmaceutical production and chemical synthesis. It has an RS 232 interface for computer compatibility.

For more details write to : Orbit Technologies Pvt. Ltd. 404, 4th Floor, Taramandal Complex, Saifabad, Secretariat Road, Hyderabad, AP 500 004
{Chemical Products Finder, January 1998, 14}

125 Potato chip processing apparatus

The apparatus described in this patent DE 19607140-A1, DE 19607141-A1 is for fat removal from potato chips and is designed for the low-fat or 'better for you' range of snack products. The 'novel' equipment incorporates (a) and extractor (b) a basic flavouring unit and a drier. The extractor is either a carousel extractor, a belt extractor, a sieve drum extractor, a beaker-unit extractor or a combination of these. A schematic is provided in the full patent. The oil is flushed from the chips using a polar or non-polar solvent, the oil content then standardized, the chips being flavoured using a dispersion assembly and then dried.

The advantage claimed is that the assembly operates as an enclosed

unit or a continual or batch basis, minimizes the risk of explosion and damage to the chips and their texture. A second patent describes the use of absolute alcohol for fat removal. It is far more economical and safer to use steam for removal of up to 25-30% of the fat in potato chips.
{Lipid Technology, January 1998, 19}

126 Moisture measurement

Infrared Engineering says it has developed a new technology offering sugar refiners a breakthrough in moisture measurement and control, providing significant improvements in product handling efficiency.

The company says the MM55 near infrared sensor has been optimised for use with white crystal sugars, creating the first on-line system capable of reliable, accurate continuous measurements of the very low final moisture levels in refined sugar - typically in the range of 0.04 - 0.12%. Sugar allowed to become too moist tends to conglomerate and set into lumps or 'cakes', causing severe problems for handling, storage and distribution, Infrared Engineering says. Accurate moisture measurement throughout processing can be used for direct control of fluid bed dryers and ovens, ensuring that moisture levels stay below critical values and the sugar will flow freely.

The MM55 is a non-contact sensor which measures the moisture content of sugar by looking at the way it absorbs or reflects selected wavelengths of near infrared (NIR) light. It is hygienic, safe, accurate and reliable, and is already widely used throughout the food industry for moisture measurement in products including snack foods, flour, milk powder and coffee, the company says.

According to Infrared Engineering, at present, sugar moisture is most commonly monitored using laboratory analysis on a sample taken from the line. Operating on-line, the MM55 gives the processor or instant indication of any movement of the moisture level away from the target value, facilitating immediate action to prevent the sugar setting.
{Confectionery Production, September 1997, 24}

127 Moisture meter

Zeltex, Inc., has announced availability of their improved benchtop KJT-200 Moisture Meter for analyzing chemicals, pharmaceuticals, and foods, including grains. Twelve inches high and less than 20 lbs., the KJT-200 uses near-infrared reflectance principles of spectrum analysis to measure moisture in diverse materials including adhesives, cellulose, plastics, liquids, grains, etc., from 0.05% to 45%.

A typical lab accurate analysis can be performed in seconds using the KJT-200's internal microprocessor without contacting or destroying the product. The KJT-200's fast sampling speed provides for the measurement of moisture absorption rate in extremely hygroscopic materials. Data can be transmitted via RS-232C port to a printer or computer for statistical analysis. Automatic measurement starts when a sample is placed on the turntable and an automatic zero adjustment and rotating turntable assure accuracy over the entire sample.

{Dairy, Food and Environmental Sanitation, July 1997, 450}

PACKAGING

128 Vacuum meters for food packages

Abiss of France offers vacuum meters for food packages. The measure of vacuum in food packs is a key factor of their shelf life and thus of their quality. The VS 2000 and VD 3000 are the ideal testers to check that the vacuum pumps work properly and that packaging machines make good sealings. These testers can measure the instant pressure in the pack or the maximum level of vacuum before re-injection of gas. They can also store in their memory the evolution of vacuum if they are packaged as a dummy product in an actual pack. These very small testers are battery operated and they have an autonomy of about 6 months.

For further information contact : Technovation, 4 Paramel, St. Cyril Road, Bandra, Mumbai 400 050
{Industrial Products Finder, Annual 1997, 173}

129 System that measures and prints residual oxygen in food packaging

Oxyprint from Abiss, France, measures and prints residual oxygen in food packaging. Every day thousands of trays of sachets of food are packed under modified atmosphere. The first commitment to assure the highest quality to the products is to control precisely the residual oxygen. This is easy with the Oxyprint which has a 0.1% to 100% detection range. It can be used both in the production lines and in the control laboratories. The Oxyprint has a built-in printer which helps the user to fulfil traceability requirements for the highest quality.

For further information contact : Technovation, 4 Paramel, St. Cyril Road, Bandra, Mumbai 400 050
{Industrial Products Finder. Annual 1997, 141}

130 Biodegradable food container

An eco-friendly biodegradable food container that can substitute paper and polystyrene foam containers has been developed by an American company, reports Plastics News. The new container which has been approved by environmental groups worldwide is made of ground limestone, potato starch and wood fibres (new fibres or those obtained from recycled paper).

This new packaging material is first puffed up by using steam as a blowing agent and then baked in an equipment similar to those used for making ice cream cones. On the contrary, conventional food containers that are made from polystyrene - a petroleum based raw material - are manufactured by using 'ozone depleting' hydrochloroflurocarbons (HFC's) as blowing agents.

Designed with the help of the life cycle analysis (LCA), this new food container is said to possess the much needed functionality at competitive prices, especially in comparison to conventional and existing products. The new product affords a number of

advantages over conventional food containers. It requires lesser energy during the manufacturing process and lesser amounts of greenhouse gases are released.

Moreover its 'after use' properties are very desirable. Specifically, the new packaging, when crushed after use is said to dissolve during use even when brought into contact with liquids. While the starch and wood fibre are bio-degradable, the dissolved limestone washes away in water. Finally the waste that remains can also be utilised to produce agricultural fertilisers.

The strength of the containers is also said to be greater than conventional polystyrene containers. By and large, container manufacturers have reacted very positively to this new method of food packaging. One of the major reasons for the quick and growing acceptance of this new product is the fact that besides the enormous environmental gains achieved, the manufacturing costs and waste collection/processing costs are also significantly reduced.
(PTI Science Service, 16(24), 1997, 9-10)

ANALYSIS

131 New method to detect marker genes in foodstuffs

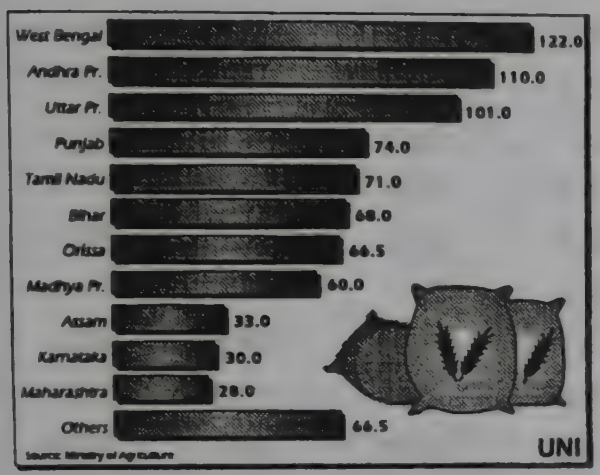
A group of scientists working under professor Orjan Olsvik of the Institute of Medical Biology at the University of Tromso, North Norway, has succeeded in developing a method of detecting so-called marker genes in genetically engineered foodstuffs. The team's findings are of particular significance now since scientists across the world are in the midst of heated discussion on the pros and cons of genetically engineered foodstuffs. In early July, legislation was passed in Norway requiring all genetically engineered foodstuffs to be marked within three months.

The team's point of departure was the most common antibiotic resistance genes that are used as marker genes in foodstuffs that have been genetically manipulated. The Norwegian scientists set up a so-called PCR (polymerase chain reaction) which amplifies such marker genes if they are present in the test material. Though engineered modifications may vary greatly from one type of food to another, the number of marker genes is in fact very restricted and, hence, these highly sensitive detection methods may reveal genetically modified contents in any kind of foodstuff. Though development of the PCR test is not new it is the Norwegian application of PCR technology that has aroused such interest.
(Tech Monitor, November-December 1997, 6)

COMMERCIAL INTELLIGENCE

PRODUCTION (RAW MATERIALS)

132 Rice production target for '97-98



{The Economic Times, 31 December 1997, 19}

133 Basmati rice output

Overall production (1997-98)	
State	Quantity (In metric tonnes.)
Haryana	360,000
UP	70,000
Punjab	75,000
Rajasthan	45,000
Total	555,000

{Business Standard, 9 March 1998, 8}

134 India's share in world production of major fruits and vegetables (1995)

	World Production	India's Share (in %)
Vegetables & Melons	487287	3.74
Cabbage	42110	7.83
Tomatoes	78282	6.13
Cauliflower	11028	43.53
Potato	280679	6.77
Dry Onion	32402	12.34
Garlic	7813	4.48
Green peas	4349	6.21
Fruits :		
Grapes	53255	1.41
Apples	49682	2.42
Oranges	57796	3.46
Lemons & Limes	9039	18.81
Mangoes	19003	52.62
Pineapples	11547	7.10
Bananas	54467	17.44
Papayas	5245	6.86
Nuts :		
Cashew Nuts (MT)	678036	2.38
Plantation Crops :		
Coffee	5603	3.03
Cocoa Beans	2529	0.28
Tea	2627	27.22
Sugarcane	1147992	22.60

{Business Line, 22 March 1998, 15}

135 Wheat estimates

	Area (million ha.)			Production (million tonnes)		
	1996	1997	1998	1996	1997	1998
W Europe	17.1	17.4	18.0	100.8	95.9	101.6
EU	16.9	17.2	17.8	99.8	94.9	100.6
C/E Europe	8.7	9.7	9.0	25.9	33.1	31.3
Former USSR	47.8	47.9	47.7	64.9	80.0	77.5
Kazakhstan	12.2	12.0	11.8	8.0	8.7	9.5
Russia	25.9	25.0	25.7	34.9	44.2	42.0
Ukraine	5.5	6.5	5.8	13.5	18.0	17.4
N & C America	38.9	37.9	36.0	95.3	96.6	88.6
Canada	12.7	11.4	10.8	29.8	24.3	23.5
US	25.5	25.7	24.4	62.1	68.8	61.5
S America	10.0	8.3	8.6	22.1	19.9	18.8
Argentina	7.1	5.7	5.8	15.9	14.5	13.0
Brazil	1.8	1.5	1.7	3.2	2.8	3.0
Asia	85.3	85.2	84.6	227.1	248.9	237.7
Near East	18.4	18.9	18.7	32.0	33.5	33.8
Iran	6.2	6.6	6.5	8.8	10.2	10.5
Turkey	8.5	8.5	8.6	16.2	16.5	16.2
West Asia	66.9	66.3	65.9	195.1	215.5	203.9
China	29.6	29.5	29.3	110.6	124.0	115.0
India	25.1	25.5	25.0	62.6	68.7	66.0
Pakistan	8.4	8.1	8.2	16.9	16.7	17.5
Africa	11.2	8.9	10.1	22.2	15.0	19.9
Egypt	1.0	1.1	1.1	5.7	5.6	5.8
Morocco	3.2	2.6	3.0	5.9	2.3	5.2
Oceania	11.4	10.9	10.5	23.9	18.7	17.7
Australia	11.3	10.8	10.5	23.7	18.5	17.5
Total	230.3	226.2	224.4	582.2	608.2	593.0

{Business Line, 4 April 1998, 21}

136 Fruits production

India ranks second in the production of fruits next to China with 9.47 per cent of the world annual production of 413.93 million tonnes.

Mango alone accounts for 47.93 m.t. in India (22.93 per cent of the total fruit production), guava 2.9 per cent and litchi 0.34 per cent.

During 1995-96, India exported 1.03 lakh tonnes of fresh fruits valued Rs.147.56 crores. Out of this, mango alone accounted for 22 per cent in quantity and 26 per cent in value.

India produces 10 m.t. of mango annually which is 52 per cent of the world production. Andhra Pradesh leads in production (3.07 m.t.) followed by Uttar Pradesh (2.39 m.t.) and Bihar (1.79 m.t.). The national average productivity of mango is 8.95 tonnes per hectare.

During 1995-96, the country exported 0.226 lakh tonnes of fresh mangoes valued Rs.38.52 crores. The UAE, Saudi Arabia and Kuwait are the major importers of Indian mangoes. India's presence in the European Union markets is negligible (three per cent of the total worth of $72 millions) in comparison to imports from Brazil, the US, South Africa, Ivory Coast, Venezuela, Israel, Peru and Pakistan.

Alphonso mango accounts for 90 to 95 per cent of the mangoes exported.

Litchi production in India is only 0.33 m.t. annually. Bihar has the highest production of 0.27 m.t. During 1995-96, the country exported only 800 kg of litchi worth Rs.0.64 lakhs. France and Switzerland are the major importers of litchi from India.

Guava production in India is 1.4 m.t. annually. Bihar leads in production (0.32 m.t.), followed by Uttar Pradesh (0.17 m.t.) and Karnataka (0.15 m.t.). During 1995-96, India exported 221 tonnes of guava valued Rs.30 lakhs. Saudi Arabia, Jordan and UAE are the major importing countries. Singapore and the Netherlands also imported sizeable quantities.

{Business Line, 29 January 1998, 13}

137 Saffron production

The saffron season in pampoosh valley in Phelgaon commenced in November 1997. This season, traders estimated the crop to be around the same level of 30,000 - 35,000 kg as harvested last year. Quality of Indian saffron exceeds in terms of colour, aroma and long shelf life of 3 - 4 years.

(The Economic Times, 31 March 1998, 8}

138 Mushroom Production

Mushrooms are not only a gourmet's delight but also a money spinner for cultivators.

The country is also gradually emerging as a regular exporter of this high-value culinary product. The spurt in mushroom production, as also exports, has indeed been quite noticeable in the nineties. While the output rose form about a 1,000 tonnes in 1990-91 to nearly 32,000 tonnes in 1995-96, the export earnings shot up from a mere Rs.8.32 crore to nearly Rs.50 crore during this period.

(Business Standard, 3 March 1998, 6}

139 Coconut production

Country	Area	Percentage	Production	Percentage
India	1,796	15.51	13,968	26.06
Indonesia	3,745	32.35	13,595	25.36
Philippines	3,093	26.71	11,935	22.27
Sri Lanka	419	3.62	2,546	4.75
Thailand	377	3.26	1,130	2.11
Vietnam	190	1.64	1,065	1.99
Paupa New Guinea	260	2.25	960	1.79
Malaysia	280	2.42	722	1.35
Vanuatu	96	0.83	346	0.65
Solomon Islands	59	0.51	287	0.54
Fiji	65	0.56	196	0.37
Western Samoa	75	0.65	160	0.30
Palau	14	0.12	70	0.13
Micronesia	17	0.15	40	0.07
Others	1,092	9.43	6,576	12.27
Total	11,578	100.00	53,597	100.00
Area in '000 hectares			Production in million nuts	

(Business Line, 2 March 1998, 11)

140 World fish production

	1994	1995	1996 prelim.
	(.....million tons.....)		
China	20.7	24.4	25.0
Peru	11.6	9.0	9.6
Chile	7.8	7.2	6.9
Japan	7.4	6.8	6.6
United States	5.9	6.0	5.9
India	4.5	4.9	5.1
Indonesia	3.9	4.0	4.2
Russian Fed.	3.8	4.2	4.6
Others	44.0	46.5	45.3
TOTAL	**109.6**	**113.0**	**113.2**

{Food Outlook, July - September 1997, 26}

141 Milk production

	1996	1997 estim	1998 fcast
	(.....million tons.....)		
WORLD	539	545	555
EC	125	125	125
United States	70	71	72
India	68	71	74
Russian Fed.	36	35	34
Pakistan	20	21	22
Brazil	18	19	21
Ukraine	16	14	14
Poland	11	11	12
New Zealand	10	11	11
Australia	9	9	9

{Food Outlook, October - December 1997, 35}

142 Sugarcane production (lakh tonnes)

States	1991-92	92-93	93-94	94-95	95-96	96-97
Andhra Pradesh	150.57	121.63	134.74	160.46	152.16	149.45
Assam	14.54	15.48	13.74	15.05	14.90	15.00
Bihar	70.76	60.31	43.98	56.63	56.44	56.00
Gujarat	102.39	108.72	102.32	107.85	105.11	103.50
Haryana	90.00	65.50	64.20	70.10	80.90	89.60
Karnataka	241.17	224.80	266.03	330.93	249.18	218.52
Kerala	5.47	4.28	4.48	4.78	4.64	5.50
Madhya Pradesh	16.46	13.25	10.84	13.77	20.23	22.11
Maharashtra	361.87	308.53	278.92	442.60	466.56	436.04
Orissa	27.45	7.54	7.81	11.99	15.74	14.19
Punjab	69.20	63.69	47.10	51.60	86.20	110.40
Rajasthan	13.61	11.29	10.20	9.87	13.85	12.90
Tamil Nadu	248.87	230.64	259.92	364.56	345.76	265.00
Uttar Pradesh	1,110.98	1,029.29	1,040.82	1,102.39	1,198.30	1,186.32
West Bengal	9.69	8.89	5.42	6.49	13.12	18.91
Others	6.92	6.49	6.08	6.33	5.86	6.27
TOTAL	2,539.95	2,280.33	2,296.60	2,755.40	2,828.95	2,709.71

{The Economic Times, 6 April 1998, 8}

143 World cassava production

	1995	1996	1997 prelim.
	(..... million tons .....)		
WORLD	**165.3**	**162.3**	**164.1**
Africa	**84.7**	**82.1**	**83.0**
Congo Dem. Rep.	18.9	16.8	16.8
Ghana	6.6	7.1	7.1
Madagascar	2.4	2.4	2.4
Mozambique	4.2	4.7	5.3
Nigeria	31.4	31.4	31.4
Tanzania	6.0	4.3	4.4
Uganda	2.2	2.2	2.3
Asia	**48.2**	**47.7**	**48.5**
China	3.5	3.5	3.5
India	6.0	4.7	4.7
Indonesia	15.4	17.0	17.2
Philippines	1.9	1.9	1.9
Thailand	18.2	17.4	18.1
Viet Nam	2.2	2.2	2.1
Latin America and Caribbean	**32.2**	**32.1**	**32.4**
Brazil	25.3	24.9	25.4
Colombia	1.8	2.0	1.8
Paraguay	2.7	2.6	2.6

{Food Outlook, October-December 1997, 31}

144 World meat production

	1995	1996	1997
	(..... million tons .....)		
WORLD TOTAL	**209.5**	**217.3**	**227.2**
Poultry meat	55.5	58.4	62.6
Pig meat	83.2	86.9	91.4
Bovine meat	56.2	56.9	57.6
Sheep meat and goat meat	10.7	11.1	11.5
Other meat	3.9	4.0	4.1
DEVELOPING COUNTRIES	**108.8**	**116.9**	**126.0**
Poultry meat	27.4	29.6	32.6
Pig meat	47.2	51.4	55.9
Bovine meat	24.8	25.9	27.0
Sheep meat and goat meat	7.1	7.6	8.0
Other meat	2.3	2.4	2.5
DEVELOPED COUNTRIES	**100.6**	**100.5**	**101.2**
Poultry meat	28.0	28.9	30.0
Pig meat	36.0	35.5	35.4
Bovine meat	31.4	31.0	30.6
Sheep meat and goat meat	3.6	3.5	3.5
Other meat	1.5	1.6	1.6

{Food Outlook, July - September 1997, 21}

PRODUCTION (INDUSTRIAL)

145 Arecanut production

India grows roughly 3 lakh tonnes of arecanut per annum, of which Karnataka, Kerala and Assam accounts for nearly 90 per cent. During 1994 - 95,

2.72 lakh tonnes of arecanut was grown in about 2.35 lakh hectares in the country. During the same year, Karnataka produced about 1 lakh tonnes in around 68,500 hectares. Kerala produced 80,900 tonnes in 69,000 hectares and Assam contributed 54,500 tonnes in 71,400 hectares.

{The Economic Times, 31 March 1998, 8}

146 Production of vanaspati during oil years 1991-92 (Nov - Oct) onwards

(in '000 MT)

MONTH	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97
NOVEMBER	67.6	69.8	79.7	66.0	81.0	87.0
DECEMBER	72.2	71.3	83.1	72.4	73.7	79.0
JANUARY	68.2	80.9	72.6	79.9	84.9	84.0
FEBRUARY	71.2	83.6	80.8	76.1	84.7	79.0
MARCH	70.0	81.9	81.1	72.2	85.0	83.2
APRIL	81.4	86.0	80.2	86.8	93.5	80.7
MAY	78.1	77.3	81.9	96.7	91.0	103.1
JUNE	69.0	72.3	80.2	80.7	72.0	87.6
JULY	70.1	66.5	78.5	78.9	72.0	88.6
AUGUST	68.6	65.2	77.5	70.6	84.0	84.0 (T)
SEPTEMBER	67.5	61.2	71.1	78.5	81.0	
OCTOBER	73.6	74.8	71.4	88.3	92.0	
TOTAL	857.5	890.8	936.1	947.1	994.8	856.2

T - Tentative

{VOP News Bulletin, 2(3) 1997, 10}

147 Asian coffee : producing countries

	Production (000 Bags)	World Rank 1996/97
Indonesia	8,023	3
Vietnam	4,333	4
India	3,050	8
Thailand	1,550	16
Papua New Guinea	1,115	20
The Philippines	883	23
Others	300	-

{The Economic Times,16 February 1998, 8}

EXPORT

148 Rice exports

(Qnty in lakh tonnes)

BASMATI		NON-BASMATI	
Year	Qnty	Year	Qnty
1994-95	4.42	1995-96	51.20
1995-96	3.90	1996-97	24.70
1996-97	4.48	1997-98	15.00
1998-99	10.0*		

(* Projections)

{Business Standard, 9 March 1998, 8}

149 Wheat products export allowed

The Government has approved the removal of quantitative restrictions on exports of milk and oilseeds and allowed wheat product exports as part of the efforts to boost agricultural trade in the current fiscal. Official sources said the Government had, however, fixed ceiling of five lakh tonnes for export of wheat products which had to be in consumer packs. Concerned over the sagging exports, the Commerce Ministry was keen on giving a fillip to agro exports and only recently gave clearance for exports of pulses in consumer packs.

Removal of quantitative restrictions on milk exports comprised baby milk and sterilised liquid milk, while oilseeds including groundnuts, sesame seeds, niger seeds and castor seeds.

Besides, the air freight subsidy scheme on selected horticulture and floriculture products and vegetables will be continued up to March this year to cover the full year. Also air freight subsidy scheme has recently been approved for exporting one-day-old chicks and eggs for hatching purposes. Special efforts to develop protocol for export of mangoes to Japan, Australia and New Zealand were on with the setting up of cargo handling facility for perishable commodities at Indira Gandhi airport here. The Commerce Ministry has also taken up with the Finance Ministry the reported move to withdraw concessions to exporters under the Income Tax Act, sources said. The Ministry has made a forceful plea for not withdrawing these concessions by amending the provisions in the new Income Tax bill now under consideration.

(Business Line, 26 February 1998, 13)

150 Export of spices

Export of spices during the first ten months of the current fiscal (April, 1997, to January, 1998) has gone up by one per cent in terms of quantity and 15 per cent in value terms compared with the same period last year.

According to sources in Spices Board, around 1,74,125 tonne of spices, worth Rs.1,045 crore were exported during the 10 month period as against 1,73,124 tonne worth Rs.905.81 crore during the corresponding period last year.

Exports of cardamom (small), turmeric, coriander, cummin, fennel, curry powder and other seeds had gone up both in terms of quantity and value.

Exports of cardamom (large), chilli, celery, fenugreek and mint oils had declined both in quantity and value whereas that of pepper, ginger, garlic, other spices and spice oils and oleoresins had declined in quantity, they said. There was a 29 per cent increase in the price of pepper compared with last year even though exports in terms of quantity fell by 22 per cent, sources said.

Pepper continued to be the leader in the export earnings during this period with a share of 35 per cent followed by spices oils (16 per cent) and oleoresins (11 per cent). The total exports of pepper stood at 27,500 tonne worth Rs.368.94 crore as against 35,075 tonne worth Rs.285.1 crore during the corresponding period in the previous year. The average

FOB price realised in the current year was Rs.134.16 per kg as against Rs.81.28 per kg the previous year.

Against the tentative export target of 2.25 lakhs tonne, worth Rs.1,200 crore for 1997-98, the achievement by the end of the 10 month period was 77 per cent in quantity and 87 per cent in terms of value, sources added.
{Business Standard, 10 March 1998, 12}

151 Export performance - cardamom

		Quantity (tonnes)	Value (Rs lakh)
1992 -93	Cardamom (small)	190	750.57
	Cardamom (big)	1,255	881.66
1993 -94	Cardamom (small)	387	1,454.83
	Cardamom (big)	1,797	1,256.96
1995 -96	Cardamom (small)	257	762.61
	Cardamom (big)	1,293	812.74
1996 -97	Cardamom (small)	240	921.30
	Cardamom (big)	1,450	1,047.40

{Financial Express, 16 February 1998, 16}

152 Shrimp export

India has emerged as the main supplier of frozen shrimp to Japan relegating Indonesia to the second spot after a long gap of 11 years.

According to the Marine Products Exports Development Authority (MPEDA) sources here, the share of Indian shrimp in Japanese market, which continues to be the major market for Indian shrimp, has increased from 12.20 per cent in 1993 to 21.96 per cent in 1997 in terms of value. Compared to 1996, Indian exports of frozen shrimp to Japan had increased considerably during 1997, registering an increase of 11.21 per cent in terms of volume and 21.63 per cent in terms of value.

The exports have increased from 49,823 tonnes to 57,627 tonnes in terms of volume and Rs.1,653.59 crore ($462.54 million) to Rs.2,064.91 crore ($569.63 million) in terms of value during the period the sources said. The export of other items like frozen cuttlefish and squid had also made a positive growth till 1996 with a marginal decline in 1997, the sources added.

The demand for frozen shrimp in Japan is primarily depending on changes in the prices of shrimp in the supplying countries, yen to dollar fluctuation, price of shrimp in alternative markets, quantum of disposable income and finally consumer preference including festive seasons, MPEDA sources said. The main determinant of demand for shrimp in Japanese market appears to be price factor, while personal disposable income seems to be more important in the US. The per capita consumption of shrimp in Japan is estimated to be 3.3 kg, the sources added.

India's main competitors for frozen shrimp in Japanese market are Indonesia, Thailand and Vietnam. India presently occupies the first position with a share of 21.96 per cent from 17.56 per cent of the previous year.

Japan also continues to be the major market for Indian lobsters, one of the high-value items which constituted

1.33 per cent of the country's seafood exports in terms of value.

In fact, 64.85 per cent of Indian exports of lobsters were to Japan, followed by Italy (10.92 per cent), the US (6.06 per cent), France (3.07 per cent) and Greece (1.96 per cent). Meanwhile, the export of frozen shrimp to Japan has also touched an all-time record in terms of quantity and value. The export of lobster during 1996-97 stood at 1,312 tonnes valued at Rs.54.88 crore ($15.35 millions) compared to 1,677 tonnes worth Rs.55.91 crore ($17.72 millions) in the previous year, according to MPEDA sources.

Various product forms of shrimp that are being exported to Japanese market are headless shell on shrimp which constitute the major share of 64 per cent followed by peeled varieties 35 per cent and the rest is constituted by head on shrimp varieties.

Among headless varieties, black tiger constitute about 70 per cent, followed by white 15 per cent, flower 7 percent, brown 5 per cent and the rest are sea tiger and 'karikadi' varieties.
(The Financial Express, 8 March 1998, 2)

153 Tea export

South Indian tea in branded consumer packs under the brand name Nargis is slated to hit the Russian market in March. Nargis is the common brand name coined by several of India's major tea producers and blenders in their bid to add value and systematically carve out a market for Indian tea in Russia. So far, only north Indian CTC teas were branded in consumer packs under the brand name of Nargis and exported to the CIS countries. This is the first major in-road by South Indian tea in similar consumer packs to the Russian destination. While the North Indian tea has been packed in small red packs, the South Indian variety has been packed in green packs.

Exports by destination - 1996

(Qty. in tonnes)

Destination	Exports
United Kingdom	24,550
Ireland	3,220
Netherlands	2,440
Germany	6,460
Poland	9,420
CIS	45,900
Afghanistan	830
Iran	3,210
Saudi Arabia	2,470
UAE	22,610
Jordan	780
Pakistan	300
Japan	2,640
UAE	6,490
Sudan	50
Canada	730
US	4,750
Australia	1,120
Other Countries	15,890
Total	1,53,860

The CIS countries continues to remain the most dominant destination for Indian tea exports. The region alone accounted for 29.86 per cent of the country's tea exports in 1996. Though the final figures are still awaited, the share of CIS in India's total tea exports are expected to have surged during 1997 as well.

The UK remains the single most important destination for Indian

orthodox tea exports. The US remains an extremely price conscious market, sources in the industry said. This is the prime reason why the consistency of exports to that destination had been extremely poor, the sources said.
{Business Line, 26 February 1998, 13}

154 Processed-foods export

Exports of processed foods touched a record high of Rs.7,666 crore during 1996-97 from a mere Rs.1,852 crore five years ago.

The commerce minister urged the sector to capitalise on the country's inherent strengths of a large agro-production base and strive for achieving at least one-and-a-half per cent share of the global trade by the end of the century and five per cent by the end of the first decade of the 21st century.
{The Financial Express, 9 January 1998, 6}

155 EU's reduction in aflatoxin levels may hit Indian exports

India's exports to the 15 nation European Union (EU) of groundnuts, cashew nuts, walnuts, pepper and oil-cakes are under threat. In a further attempt to protect the health of EU consumers, the European Commission has proposed very low permissible levels of aflatoxin, a cancer causing substance present in mould.

The levels set by individual EU countries are already well below those set by the main supplier countries, such as the United States, China, India, Vietnam and the Argentina.

The Commission proposal, if adopted, would be applied across the EU.

Where the product is not for direct human consumption the European Commission has proposed a total permissible level of 10 parts per billion (ppb), of which the B1 aflatoxin strain cannot exceed 5 ppb. For products for direct consumption like shelled nuts the proposed total level is 4 ppb, the B1 level 2 ppb.

India has set the B1 level at 30 ppb, China at 20 ppb. Neither has set total levels. The US has set only a total level of 20 ppb, as have Vietnam and the Argentina.

India is a major supplier of unshelled groundnuts, mainly to the UK. It is the largest supplier of cashew nuts, with 81 per cent of the market, and walnuts, with a 27 per cent market share.

It is the second largest supplier of pepper (12 per cent market share), and the fourth largest supplier of oilcakes (6 per cent market share).

Scientific evidence suggests that the risk of cancer from aflatoxin is negligible. An FAO/WHO committee believes there is insufficient evidence to set tolerable in-take levels.

It is claimed that if the total level is reduced from 20 to 10 ppb, the risk factor would fall by just two additional cancers for a population with EU living standards of one billion.
{Economic Times, 5 February 1998, 19}

156 Exports of processed foods (1991-1997)

(in Rs. crores)

	91-92	92-93	93-94	94-95	95-96	96-97
Processed fruits & vegetables (including walnuts)	199	263	318	409	479	460
Animal products	248	314	345	448	686	814
Other processed foods	247	285	512	411	1043	1642
Cereal products (including basmati & non-basmati rice)	755	898	1280	1280	4952	3879
Marine products	1376	1767	2504	3576	3501	4121
Total	2821	3527	4960	6124	10661	10916

{Business Line, 22 March 1998, 15}

TRADE NEWS

157 India's chicken population records fastest growth

India's chicken population has registered the fastest growth in the Asia Pacific region in the last decade, according to a report of the Bangkok-based United Nations Economic and Social Commission for Asia and Pacific.

The country also has the largest stock of cattle in the world, but herd size has been static for a decade, online news service, "Asia Pulse" said, quoting the report.

India produced 435 million chicks in 1993, registering a growth of 10.4 per cent since 1982, which was higher than the 7.7 per cent and 8.9 per cent growth recorded by China and Indonesia, the other major chicken breeding countries in the region, it said. The country, which has a sizeable goat population, also increased its herd from 95 million in 1982 to 117 million in 1992 after a growth of 3.7 per cent during the preceding decade. The Asia Pacific region, the report says, produces about 26 per cent of the world's livestock and dairy products.

While production of meat, milk and eggs doubled between 1980 and 1992 in the region, which owns about 43 per cent of the world's livestock, consisting of buffaloes, pigs, sheep and goats, and raises about the same percentage of the world's poultry birds, its per capita availability is only half the world average, with developing countries in the region having a still smaller share, it said.

{Deccan Herald, 24 February 1998, 22}

158 Perishables handling system at Sahar

The Agricultural Products Export Development Authority (APEDA) is setting up a Rs.50-crore perishable cargo handling system at the Sahar International Airport at Mumbai, APEDA Chairman, Mr. D.Rajagopalan, said here on Tuesday.

A techno-economic feasibility study was being conducted on the project and work on it was expected to commence in 1998-99, he said.

APEDA had also identified 61 places in the country to set up cold chain linkages to increase the shelf life of perishable agricultural produce.

Agro-exports from India have a large potential for growth. World agro-export market is $24.8 billion while India's presence is a negligible $44.9 million. "There is a total mismatch between being the world's largest producer of agricultural produce and its abysmal lack of presence in the world trade", he said.
{Business Line, 25 February 1998, 13}

159 Coffee sipping habit on the decline

The number of coffee drinkers in India is going down quickly because of severe competition from rivals like tea and colas, as industry official said on Wednesday.

Harish Bijoor, senior general manager (marketing), Consolidated Coffee Ltd, said in a report at the annual coffee conference here that coffee had only a 5.4 per cent share of the beverage market in India. "Tea is the dominant beverage of the nation", Bijoor said. A recent survey showed that tea was present in 91 per cent of Indian homes. "A point to worry is the fast shrinking base for the beverage", Bijoor said. "The per capita consumption of coffee stands at a mere 58 gm for the entire country".

He said domestic consumption was "shrinking at the rate of four per cent per annum". The problem of coffee is one of image because it is seen as the drink of old people, he said. "The young will have their colas. The middle-aged ones will stick to tea. The old will still stick to coffee. Not surprisingly, they are a vanishing lot", Bijoor added.

Coffee is a leading beverage in other Asian countries like Japan which imported 3,03,905 tonne of green coffee in the first 11 months of the year as against 302,483 tonne in the same period last year.
{Business Standard, 23 January 1998, 14}

160 Vanaspati units (state-wise) as on 31 October, 1997

Name of State	No. of running unit	Capacity of running unit (in MT)
Andhra Pradesh	7	76500
Assam	2	30000
Bihar	2	36000
Gujarat	6	111000
Haryana	9	97500
Himachal Pradesh	2	33750
Jammu & Kashmir	3	16500
Karnataka	1	7500
Kerala	2	12000
Madhya Pradesh	6	175500
Maharashtra	13	243000
Orissa	2	30000
Punjab	18	301800
Rajasthan	9	150000
Tamil Nadu	9	75000
Uttar Pradesh	18	350950
West Bengal	6	173250
Total	115	1920250

{VOP News Bulletin, 2(3) 1997, 9}

161 Targeted annual growth during ninth plan

(Per cent)

	Annual growth 1980-94	Growth needed to meet Domestic demand IX Plan	Target IX Plan
I. Agricultural crops	2.77	-	3.82
(a) Food grains	2.67	2.73	3.05
1. Rice	3.41	2.19	2.75
2. Wheat	3.44	2.91	3.75
3. Coarse cereals	0.67	2.05	2.20
4. Pulses	1.16	6.31	3.50
(b) Oilseeds	5.81	2.28	5.25
(c) Sugarcane	2.79	3.78	4.00
(d) Fruits & Vegetables	4.15	6.00	7.00
(e) Cash crops	1.40	-	2.64
1. Cotton	3.57	-	4.00
2. Tea	2.65	2.24	5.00
3. Coffee	4.51	-	5.00
4. Spices	3.92	0.15	4.25
5. Rubber	8.50	-	9.00
II. Livestock	4.57	-	6.59
(a) Milk	4.89	6.22	7.04
(b) Meat & Poultry	5.66	5.90	7.50
(c) Others	1.50	-	2.00
III Fishery	6.31	4.19	6.50
Total	3.21	-	4.50

{Business Line, 4 March 1998, 13}

162 Investment in food processing since July 1991

Sub-Sector		Approvals (JV/FC/IL/100%EOU etc.) (Upto 1997 October)		Industrial Entrepreneur Memorandums (Upto 1997 October)	
	No. of Units	Total Invest. (Rs. Crores)	Foreign Invest. (Rs. Crores)	No. of Units	Total Invest. (Rs. Crores)
Grain milling & grain based	77	857	478	294	4952
Fruits & vegetable products	366	4628	812	343	2949
Meat & Poultry products	54	1341	420	65	362
Deep-sea fishing, fish processing & agriculture	183	2105	552	100	436
Fermentation	210	2049	591	358	7165
Consumer Industry including soft-drinks/ water/ confectionery etc.	67	5182	4580	388	5901
Milk & Milk products	21	929	365	1051	13245
Others (including food additives, flavours etc.)	51	673	238	---	---
Edible oil/oilseeds	---	---	---	1621	13105
Total	**1029**	**17764**	**8036**	**4220**	**48115**

Employment	No. of Units	Employment (lakh persons)	No. of Units	Employment (lakh persons)
Urban	88	0.15	610	0.61
non-Urban	947	2.51	3610	5.94
Total	**1029**	**2.66**	**4220**	**6.55**

(Business Line, 22 March 1998, 15)

FOOD REGULATION, QUALITY CONTROL AND HYGIENE

163 Canned vegetables, fruits get 'healthy' US certification

Frozen and canned fruits and vegetables may be labelled and sold as 'healthy' foods, the US Food and Drug Administration (FDA) said on Wednesday. Some enriched bread products can also carry the label, the agency ruled.

"The new rule is designed to encourage greater use of foods whose consumption is recommended in the US dietary guidelines as important for the maintenance of good health", the FDA said in a statement.

It said the industry had proved that frozen and canned vegetables can contain as many nutrients as fresh ones, and sometimes more.

"The issues were not complex," Elizabeth Campbell, acting director of the FDA's office of food labelling, said.

The American Frozen Food Institute (AFFI) presented as evidence a study that found frozen green beans contained twice as much vitamin C as fresh, raw beans.

"After three days in a display case and three days in a refrigerator - a situation that typically occurs after purchase - fresh green beans retained only 36 per cent of their vitamin C content. Frozen green beans, on the other hand, retained 77 per cent of their vitamin C content," the AFFI said.

The industry was clearly delighted.

"Consumers now will be able to see on their food labels that processed fruits and vegetables are just as healthy as raw produce, and that these processed products can be an important part of a healthy diet," said John Cady, president of the National Food Processors Association.

"Frozen fruits and vegetables are now officially where they should be; on a level playing field with fresh produce," Steven Anderson, president of the AFFI, said in a statement.
{The Economic Times, 27 March 1998, 18}

164 Non-iodised salt banned

The Government on Wednesday imposed a nation-wide ban on the sale, possession or consumption of non-iodised salt.

An official notification, amending the Prevention of the Food Adulteration Act, 1954, prohibits any person from selling or offering or keeping in his/her premises common salt for direct human consumption unless it is iodised.

But common salt may be sold for iodisation, iron fortification, animal fats preservation, manufacturing, medicines and industrial use under proper label declarations, according to the notification.

The Act also makes it mandatory to label the container/package as to whether it contains the permitted anti-caking agent.

Deficiency of iodine, which is an essential micro nutrient for normal human growth with a daily requirement of 100 to 150 micro gm, can have adverse effects on the foetus as well as on adults, an official release said.
{Business Line, 29 January 1998, 9}

165 Applications of ionizing radiation accepted in the U.S. by the food and drug administration

Product	Dose (kGy)	Purpose	Date
Wheat, wheat flour	0.2 - 0.5	Insect disinfestation	1963
White potatoes	0.05 - 0.15	Sprout inhibition	1964
Pork	0.3 - 1	*Trichinella spiralis* control	7/22/85
Enzymes (dehydrated)	10 max.	Microbial Control	4/18/86
Fruit	1 max.	Disinfestation, Ripening Delay	4/18/86
Vegetables, fresh	1 max.	Disinfestation	4/18/86
Herbs	30 max.	Microbial Control	4/18/86
Spices	30 max.	Microbial Control	4/18/86
Vegetable Seasonings	30 max.	Microbial Control	4/18/86
Poultry, fresh or frozen	3 max.	Microbial Control	5/2/90
Meat, frozen, packaged [a]	44 min.	Sterilization	3/8/95
Animal Feed and Pet Food	2 - 25	*Salmonella* Control	9/28/95
Meat, uncooked, chilled	4.5 max.	Microbial Control	12/2/97
Meat, uncooked, frozen	7.0 max.	Microbial Control	12/2/97

[a] For meets used solely in the National Aeronautics and Space Administration space flight programs

{Food Technology, January 1998, 57}

166 BIS launches certificate scheme for food industry

The Bureau of Indian Standards (BIS), keeping in line with the international emphasis on quality certification, has launched a certification scheme - "Hazard Analysis Critical Control Points (HACCP)," specifically for the Indian food industry which is expected to enhance the marketability of the Indian food products heading for the international market.

BIS Director General P.S. Das at an awareness programme on HACCP - based quality systems certification scheme for the food industry organised by the BIS, said that with India stepping into the global arena with liberalisation it

had become important for the food industry to take measures to ensure food safety to enhance the marketability of the Indian food products in the international market.

The certification scheme meets all international requirements and has been especially tailored for the food industry.

The scheme covers preparation, processing, packaging and storage in the food processing industry. HACCP scheme is based on "IS 15000 : 1998 HACCP system and guidelines for its application" as laid down in the Codex Alimentarius Commission.
(Deccan Herald, 4 March 1998, 5)

167 Spices Board introduces quality certification

In an attempt to further promote quality consciousness and boost exports of spices, the Spices Board has introduced the concept of "quality certificate" which will be awarded to export houses with genuine commitment to quality and long term objective to sustain export growth.

"The 'Spice House Certificate' seeks to identify and recognise those investing in in-house processing facilities and infrastructure besides having necessary competence to ensure quality and reliability," sources in Spices Board said. Investments in upgrading facilities included all critical areas such as cleaning, grading, processing, packaging and warehousing, the sources added.

The scheme also envisaged employing a fool-proof system of quality assurance at all stages of processing right from raw material selection to final shipping.

"The processors are also expected to maintain a high degree of sanitation in their plants while workers are also expected to observe cleanliness and personal hygiene." they said.

The 'Spice House Certificate' is the latest compaign by the Spices Board in addition to its scheme of awarding 'Indian Spices Logo' as mark of genuine superior quality Indian spices.

Both the schemes of awarding the logo and certificate had quality upgradation of Indian spices as the ultimate objective with a basic difference in focus, the sources said.

While exporters or branded spices and spice products in consumer packs were the focal point of the logo programme, the certification scheme was aimed at exporters who shipped spices in bulk as raw materials.

Products covered by the certification scheme included whole spices as well as value added products like spice mixes, ground spices, curry blends, spice oils and oleoresins.

Some of the certified spice houses were now planning to acquire ISO-9000 certification.

So far, nine exporters, all from South India, had been awarded the Indian Spices logo. 37 exporters have already been granted the Spice House Certificate, the sources said.

Stating that quality was the only way to sustain India's share in the global

market, they said the board had also developed and implemented better production methods.
{Business Standard, 6 February 1998, 12}

168 FDA approves irradiation of meat

The Food and Drug Administration has approved irradiation of fresh and frozen red meats such as beef, lamb, and pork to control disease-causing microorganisms. The agency has also denied requests for a hearing and stay of its final rule approving irradiation of poultry. Details are in the Federal Register of Dec. 3 (62 FR 64101-64121).
{Food Technology, January 1998, 26}

169 No visible fecal material allowed on carcasses

FSIS has published a notice telling the owners and operators of federally inspected slaughter establishments that the agency regards its zero tolerance for visible fecal material as a food safety standard and that a HACCP plan for slaughter must be designed, to, among other things, ensure that, by the point of post-mortem inspection of livestock carcasses or when poultry carcasses enter the chilling tank, no visible fecal material is present. Details are in the Federal Register of Nov.28 (62 FR 63254-63255).
{Food Technology, January 1998, 26}

170 Additional binders for cured pork products approved

FSIS is allowing use of a blend of carrageenan, locust bean gum, and xanthan gum as a binder in cured pork products labeled "Ham Water Added" and "Ham and Water Product - x% of Weight is Added Ingredients." The maximum use level of 0.5% will prevent purging of the pumped brine solution from the products. Details are in the Federal Register of Nov. 19 (62 FR 61619-61620).
{Food Technology, January 1998, 26}

171 Coriander Grading and Marking Rules, 1997

G.S.R. 359. - Whereas the draft of the coriander Grading and Marking Rules, 1996 were published, as required by section 3 of the Agricultural Produce (Grading and Marking) Act, 1937 (1 of 1937), under the notification of the Government of India in the Ministry of Rural Areas and Employment number G.S.R. 385 dated the 23rd August, 1996 at pages 1820 to 1828 in the Gazette of India Part II, section 3, Sub-section (i), inviting objections and suggestions from all persons likely to be affected thereby before the expiry of the period of forty-five days from the date on which the copies of the Gazette containing the said notification are made available to the public;

And whereas copies of the said Gazette were made available to the public on the 24th October, 1996;

And whereas the objections and suggestions received from the public in respect of the said draft rules have duly been considered by the Central Government ;

Now, therefore, in exercise of the powers conferred by section 3 of the Agricultural Produce (Grading and Marking) Act, 1937 and in supersession of the Coriander Grading and Marking Rules, 1964, except as respects things done or omitted to be done before such

supersession, the Central Government hereby makes the following rules, namely:-

1. Short title, application and commencement. -

(1) These rules may be called the Coriander Grading and Marking Rules, 1997.

(2) They shall apply to Coriander (Coriander Sativum L.) whole and powder.

(3) They shall come into force on the date of their publication in the Official Gazette.

2. Definitions. - In these rules, unless the context otherwise requires :-

(a) "Agricultural Marketing Adviser" means the Agricultural Marketing Adviser to the Government of India;

(b) "Authorised Packer" means a person or a body of persons who has been granted a certificate of authorisation to grade and mark the commodity in accordance with the provisions of these rules ;

(c) "Certificate of Authorisation" means a Certificate issued under the General Grading and Marking Rules, 1998;

(d) "Schedule" means a schedule appended to these rules.

3. Grade designation.-The grade designations to indicate the quality of Coriander whole and powdered shall be as set out in column 1 of Schedule II and III.

4. Definition of quality.- The quality indicated by such grade designation and general characteristics shall be as set out against each grade designation in column 2 to 9 Schedule II and Schedule III.

5. Grade designation mark.-The grade designation mark shall consist of :-

(i) a label specifying name of the commodity grade designation and bearing a design consisting of an outline map of India with the words "Agmark and figure of the rising sun resembling the one as set out in Schedule-I-A. or

(ii) 'Agmark Replica' consisting of a design incorporating the number of Certificate of authorisation, the word 'Agmark' name of commodity and grade designation resembling the one as set out in Schedule-I-B. 1.

Provided that the use of Agmark Replica in lieu of Agmark shall be allowed only to such authorised packers who have been granted permission by the Agricultural Marketing Adviser or an officer authorised by him in this regard and subject to the conditions specified in rule 10 of the General Grading and Marking Rules, 1988.

6. Method of marking.-

(1) The grade designation mark shall be securely affixed to or clearly and indelibly printed on each container;

(2) In addition to the grade designation mark, shall the following particulars shall be clearly and indelibly marked on each label or container :-

(a) Name and address of packer :

(b) Date of packing in month and year;

(c) Place of packing ;

(d) Net weight;

(e) Lot batch number;

(f) Price;

(g) Date of expiry;

(3) An authorised packer may, after obtaining prior approval of the Agricultural Marketing Adviser or any officer authorised by him in this behalf in accordance with rule 11 of the General Grading and Marking Rules, 1988, mark his private trade mark or trade brand on the graded packages or containers, provided that the same does not indicate quality other than that indicated by the grade designation mark affixed to the graded packages.

7. Method of packing. -

(1) The graded material shall be packed in clean, sound and dry containers such as jute bags, cloth bags, polywoven bags, paper bags, polyethylene, polypropylene, metallised polyster/proyethylene laminated pouches, cardboard cartons, tin, glass or plastic containers, wooden cases, or any other packaging material as may be required by the buyer and/or approved by the Agricultural Marketing Adviser or an officer authorised by him in this behalf provided the same are made of good grade materials.

(2) Suitable lining of polypropylene, polyethylene shall be used in packing or powdered Coriander in jute bags, cloth bags, paper bags, and cardboard cartons.

(3) The containers shall be free from insect infestation, fungus contamination, deleterious substances and any undesirable or obnoxious smell.

(4) Each package shall contain graded material on one grade designation only. Small packs containing graded material of the same lot/batch and grade designation may be packed in a master container such as jute bags, wooden cases, cardboard cartons using tie-or label with details on master containers.

(5) Each container shall be securely closed and sealed.

8. Special conditions for grant of certificate of authorisation. - In addition to the general conditions specified in sub-rule (8) of rule 3 of the General Grading and Marking Rules, 1988, the following shall be the additional conditions for grant of certificate of authorisation for grading and Marking of Coriander whole and powdered under these rules namely:-

(1) The authorised packer shall either set up his own laboratory manned by a qualified chemist approved by the Agricultural Marketing Adviser or an officer authorised by him in this behalf in accordance with rule 9 of the General Grading and Marking Rules, 1988 for testing quality of coriander whole and powdered or have access to the State Grading Laboratory or private commercial lab., approved for the purpose;

(2) The premises for processing grading and packing shall be maintained in perfect hygienic and sanitary conditions;

(3) The personnel engaged in these operation shall be in sound health and free from any contagious disease.

SCHEDULE-I-A
[See Rule 5 (i)]
(Design of Agmark label)

SCHEDULE-I-B
[See Rule 5(ii)]
(Design of Agmark Label)

NAME OF COMMODITY .....

GRADE .....

SCHEDULE - II
(See rules 3 and 4)
Grade designations and definitions of quality of coriander whole (Dhania)

Grade designations	Definition of quality						
	Special requirements						
	Moisture content per cent by mass (maximum)	Organic extraneous matter per cent by mass (maximum)	Inorganic extraneous matter per cent by mass (maximum)	Insect bored fruits per cent by mass (maximum)	Shriveled immature and blackened fruits % by mass (maximum)	Split fruits per cent by mass (maximum)	Volatile oil % (v/m) (minimum)
1	2	3	4	5	6	7	8
Grade-I	11.0	0.5	0.5	1.0	2.0	10.0	0.25
Grade-II	11.0	2.0	1.0	2.0	4.0	15.0	0.20
Grade-III	11.0	3.0	1.5	3.0	6.0	30.0	0.20
*Non specified grade	11.0	...	...	...	...	...	...

General requirements
9

The coriander whole shall be .-

(a) the dried mature fruits of Coriandrum Sativum L;

(b) free from visible moulds or musty odour, rancidity, off flavour, rodent contamination;

(c) free from added colouring matter or any harmful foreign matter;

(d) free from insect infestation except to the extent as specified under column 4;

(e) in conformity to the shape, colour, taste and aroma characteristics of the variety;

(f) complying with the restrictions in regard to aflatoxin content, metallic contaminants and insecticides/ pesticides as prescribed under the Prevention of Food Adulteration Rules, 1955.

(g) free from artificial colouring matter

EXPLANATIONS :

(1) Organic Extraneous matter : Includes leaves, stems, straw, chaff stalks, other seeds, or any other organic foreign matter.

(1) Inorganic Extraneous matter : Includes dust, dirt, stones, earth, or any other inorganic foreign matter;

(2) Insect board fruits : are those fruits which are partially or wholly board or eaten by weevils or other insects;

(3) Shriveled or immature fruits : are those fruits which are not properly developed.

(4) Blackened fruits : are those fruits which are blackened materially affecting the quality.

(5) Split fruits : are those fruits which have split longitudinally.

* Non Specified grade : is not a regular grade. It is provided to meet such specific requirements of the buyer which are not covered under any of the regular grades. It shall be allowed only for export grading against a specific order from the buyer indicating the quantity and quality required.

SCHEDULE - III

(See rules 3 and 4)

Grade designations and definition of quality of coriander powder

Grade designations	Definition of quality						
	Special characteristics						
	Moisture per cent by mass (maximum)	Total ash per cent by mass (maximum)	Ash insoluble in oil HCL per cent by mass (maximum)	Crude fibre per cent by mass (maximum)	Non-volatile either extract % by mass (minimum)	Volatile oil (v/m) (minimum)	Sieve size in microns (maximum)
1	2	3	4	5	6	7	8
Grade-I	10.0	6.5	1.0	25.0	18.0	0.3	600
Grade-II	11.0	7.0	1.5	30.0	15.0	0.2	700

General Characteristics
9

The coriander powder shall be .-

(a) the material obtained by grinding clean, sound dried and mature fruits of Coriandrum sativum L

(b) free from added colouring matter or any foreign matter;

(c) free from mould growth, insect infestation of musty odour;

(d) free from rancidity, off-flavour, rodent contamination;

(e) complying with the instructions in regard to aflatoxin content, metallic contaminants and pesticides residues, as prescribed under the Prevention of Food Adulteration Rules, 1995;

{The Gazette of India Part II-Section 3-Sub-section (i) No.41, 1997, 2372-2375}

172 Ajowan Seeds (Whole and Powdered) Grading and Marking Rules, 1997

G.S.R. 372. - Whereas the draft of Ajowan seeds (Whole & Powder) Grading and Marking Rules, 1995 were published, as required by section 3 of the Agricultural Produce (Grading and Marking) Act, 1937 (1 of 1937) under the notification of the Government of India in the Ministry of Rural Areas and Employment number G.S.R. 359 dated the 19 August, 1996 at pages 1767 to 1773 in the Gazette of India, Part II, Section 3, Sub-section (i), inviting objections and suggestions from all persons likely to be affected thereby, before the expiry of the period of forty five days from the date on which the copies of the Gazette containing the said notification are made available to the public;

And whereas copies of the said Gazette were made available to the public on the 11 November, 1996;

And whereas the objections and suggestions received from the public in respect of the said draft rules have been duly considered by the Central Government;

Now, therefore in exercise of the powers conferred by Section 3 of the Agricultural Produce (Grading and Marking) Act, 1937, and in supersession of the Ajowan seeds (whole) Grading and Marking Rules, 1970, except as respects things done or omitted to be done before such supersession the Central Government hereby makes the following rules, namely:-

1. Short title, application and commencement :-
   1. These rules may be called the Ajowan Seeds (Whole and Powdered) Grading and Marking Rules, 1997.
   2. They shall apply to Ajowan Seeds (Trachyspermumammi) (linn) whole and powdered.
   3. They shall come into force on the date of their publication in Official Gazette.
2. Definition - In these rules, unless the context otherwise requires -
   (a) "Agricultural Marketing Adviser" means the Agricultural Marketing Adviser to the Government of India :

(b) "Authorising Packer" means a person or body or persons who has been granted the certificate of authorisation to grade and mark the commodity in accordance with the provisions of these rules :

(c) "Certificate of authorisation" means a certificate issued under the General Grading and Marking Rules, 1988 :

(d) "Schedule" means a Schedule appended to these rules.

3. Grade designation. - The grade designations to indicate the quality of the article shall be as set out in column 1 of the Schedule-II.

4. Definition of quality. - The quality indicated by such grade designation and general characteristics of Ajowan shall be as set out against each grade designation in columns 2 to 7 of Schedule-II and 2 to 8 of Schedule-III.

5. Grade designation mark. - The grade designation mark shall consist of -

(i) A label specifying name of the commodity grade designation and bearing a design consisting of an outline map of India with the word "AGMARK" and figure of the rising sun resembling the one as set out in Schedule I-A or;

(ii) "AGMARK Replica" consisting of a design incorporating the number of certificate of authorisation the word "AGMARK", name of the commodity grade designation and resembling the one as set out in Schedule I-B :

Provided that the use of AGMARK Replica in lieu of Agmark labels shall be allowed only to such authorised packers who have been granted permission by the Agricultural Marketing Adviser or an officer authorised by him in this regard and subject to the conditions as specified under the General Grading and Marking Rules, 1988.

6. Method of Marking -

(1) The grade designation mark shall be securely affixed to or clearly and indelibly printed on each container :

(2) In addition to the grade designation mark, the following particulars shall be clearly and indelibly marked on each container :-

(a) Name and address of the packer :

(b) Place of packing :

(c) Date of packing in month and year :

(d) Lot/Batch number :

(e) Date of expiry :

(f) Price :

(3) An authorised packer may after obtaining prior approval of the Agricultural Marketing Adviser or any officer authorised by him in this behalf in accordance with Rule 11 of the General Grading and Marking Rules. 1988 affix his private trade mark or trade brand on graded packages,

provided that the same does not indicate quality or grade other than the indicated by the grade designation mark affixed to the graded packages in accordance with these rules.

7. Method of packing .-

(1) The graded article shall be packed in clean, sound and dry containers such as jute bags, cotton bags, polywoven bags, paper bags, polyethylene laminated pouches, cardboard cartons, tin, glass, plastic containers, wooden cases, or any other materials or in such other manner as may be approved by the Agricultural Marketing Adviser or any other officer authorised by him in this behalf as per Rule 11 of the General Grading and Marking Rules, 1988 provided that the packing material is of food grade quality as permitted under Prevention of Food Adulteration Rules, 1955 ;

(2) Polyethylene or polypropylene of minimum 100 microns thickness shall be used in packing of whole and powdered material in jute bags, cloth bags and cardboard cartons ;

(3) In all cases, the container shall be free from insect infestation, fungus contamination materials impatting colour, deleterious substance or any undesirable or obnoxious smell ;

(4) Each container shall be securely closed and sealed.

8. Special conditions for grant of certificate of Authorisation.- In addition to the conditions specified in sub-rule (8) of Rule 3 of the General Grading and Marking Rules, 1988, the following shall be additional conditions for grant of certificate of authorisation for grading and marking Ajowan (Whole and Powder) under these rules, namely :-

(1) The authorisation packer shall either set up his own laboratory manned by a qualified chemist, approved by the Agricultural Marketing Adviser or an officer authorised by him in this behalf in accordance with Rule 9 of the General Grading and Marking Rules, 1988 for testing the quality of Ajowan (Whole and Powdered) or have access to the State Grading Laboratory or private commercial laboratory approved for the purpose.

(2) The premises for processing, grading and packing shall be maintained in perfect hygienic and sanitary conditions :

(3) The personnel engaged in these operations shall be in sound health and free from any contagious disease.

SCHEDULE I-A
[See Rule 5(i)]
DESIGN OF THE AGMARK LABEL

SCHEDULE I-B
[See Rule 5(ii)]
DESIGN OF AGMARK REPLICA

NAME OF COMMODITY .....

GRADE .....

SCHEDULE II
(See Rules 3 and 4)
Grade designation and definitions of quality of Ajowan (Whole) Seeds

Grade designation	Definition of quality					
	Special requirements					General requirements
	Moisture per cent by mass (Maximum)	Organic extraneous matter per cent by mass (Maximum)	Inorganic extraneous matter per cent by mass (Maximum)	Shrivelled immature weevilled damaged and discoloured seeds per cent by mass (Maximum)	Volatile oil ml/100 gms (Maximum)	
1	2	3	4	5	6	7
Grade-I	10.0	1.0	0.25	1.0	3.5	The Ajowan seed shall : (1) be the dried ripe fruits of the plant Traachysper mumammi (L); (2) taste and smell of ajowan seeds shall be fresh and normally associated with the produce. It shall not give rancid taste and musty odour ;
Grade-II	10.0	1.5	0.5	1.5	2.5	
Grade-III	11.0	2.0	1.0	2.0	1.5	

(3) be free from visible mould, live insects, any harmful foreign matter, insect infestation, rodent contamination and added colouring matter;

(4) comply with the restrictions in regard to aflatoxin content, metallic contaminants, insecticide residue, poisonous metals, crop contaminants, and naturally occurring toxic substances as prescribed under the Prevention of Food Adulteration Rules, 1955.

Explanation :

(1) Organic extraneous matter : Includes leaves, stem, chaff, other seeds or any other foreign matter.

(2) Inorganic extraneous matter : Includes sand, earth, dust, stones or any other inorganic matter.

(3) Shrivelled and immature seeds : that have not properly developed.

(4) Weevilled seeds : Seeds that are partially or wholly bored or eaten away or weevil or other insects.

(5) Damaged and discoloured seeds : Include seeds that are cut, broken, damaged and discoloured, damaged and discolouration materially affecting the quality.

SCHEDULE III

(See Rule 3 and 4)

Grade designations and definition of quality of Ajowan powdered

Grade designation	Definition of quality						
	Special requirements						General requirements
	Moisture per cent by mass (Maximum)	Total ash on dry weight basis per cent by mass (Maximum)	Acid insoluble ash on dry weight basis per cent by mass (Maximum)	Non-volatile either extract or dry weight basis per cent by mass (Minimum)	Crude fibre on dry weight basis per cent by mass (Maximum)	Volatile oil ml/100 gm (Minimum)	
1	2	3	4	5	6	7	8
Grade-I	10.0	7.0	0.5	20.0	14.0	3.5	The Ajowan powder shall be

Grade - II	10.0	8.0	1.0	15.0	18.0	2.0	the material obtained by grinding the dry, clean, ripe fruits of the plant Trachysper mum-ammi (l) : (2) The taste and smell of the powder shall be fresh and normally associated with the product. It shall not give rancid taste and musty odour; (3) The produce shall be free from dirt, mould and insect infestation ; (4) It shall also be free from added colouring matter, preservatives and foreign starch; (5) It shall be free from coarse particles and ground to such a fineness that the whole of it passes through 500 micron sieve; (6) It shall comply with restrictions in regard to aflatoxin content, metallic contaminants, pesticide residue, poisonous metals, crop contaminants, and naturally occurring toxic substances as specified under the Prevention of Food Adulteration Rules, 1955.
Grade - III	11.0	10.0	1.5	10.0	20.0	1.0	

{The Gazette of India, Part II-Section 3 - Subsection (I), No.43, 1997, 2396 - 2400}

173 Prevention of Food Adulteration (IVth Amendment) Rules, 1997

G.S.R. 284(E).- Whereas a draft of certain rules further to amend the Prevention of Food Adulteration Rules, 1955, was published as required by sub-section (i) of section 23 of the Prevention of Food Adulteration Act, 1954 (37 of 1954) with the notification of the Government of India in the Ministry of Health and Family Welfare (Department of Health), G.S.R. 278(E), dated the 16 July, 1996, in the Gazette of India. Extraordinary, Part II, Section 3, Sub-section (i), dated the 16 July, 1966,

inviting objections and suggestions from all persons likely to be affected thereby and notice was thereby given that the said draft would be taken into consideration on or after the expiry of a period of sixty days from the date on which the Gazette copies of the said notification were made available to the public. And whereas, the objections and suggestions received from the public on the said draft rules have been considered by the Central Government.

Now, therefore, in exercise of the powers conferred by sub-section (i) of section 23 of the said Act. The Central Government after consultation with the Central Committee for Food Standards hereby makes the following rules further to amend the Prevention of Food Adulteration Rules, 1955, namely :-

RULES

1.(1) These rules may be called the Prevention of Food Adulteration (IVth Amendment) Rules, 1997.

(2) They shall come into force on the date of their publication in the official Gazette except rule 2 which shall come into force after six months from the date of their publication.

2. In rule 42 of the Prevention of Food Adulteration Rules, 1995 (hereinafter referred to as the principal rules), in sub-rule (ZZZ) -

(a) In Sub-clause (1), for the word & figures "Rules 47", the following shall be substituted namely :-

"Rule 47, and an advertisement for such food".

(b) For sub-clause (2), the following shall be substituted, namely :-

2. Every package of Aspertame (Methyl ester), Acesulfame-K and Saccharin Sodium marketed as Table Top Sweetener and every package of carbonated water/Synthetic soft drink concentrate containing either of these artificial sweeteners and every advertisement for such Table Top Sweetener or such carbonated water/synthetic soft drink concentrate shall carry the following label, namely :-

"Contains .....
(name of artificial sweetener)

Not recommended for Children".

Provided that the package of aspertame (Methyl ester) marketed as Table Top Sweetener and every package of food containing Aspertame, and the advertisement for such Table Top Sweetener and Food shall also carry the following label, namely :-

"Not for Phenylketoneurics".

3. In rule 47 of the principal rules -

(a) for sub-rule (i), the following shall be substituted, namely :-

(i) No artificial sweetener shall be added to any article of food.
Provided that artificial sweetener may be used in following food articles in quantities not exceeding the limits shown against them and shall bear the label declaration as provided in clauses (1) and (2) of sub-rule (ZZZ) of rule 42.

TABLE

Sl. No.	Name of Artificial Sweetener	Article of Food	Maximum limit of Artificial Sweetener
1	2	3	4
1.	Saccharin Sodium	Carbonated Water	100 P.P.M.
		Soft Drink Concentrate	* 100 P.P.M.
	-- do --	Supari	4000 P.P.M.
	-- do --	Pan Masala	8000 P.P.M.
	-- do --	Pan Flavouring Material	8 per cent
2.	Aspertame (Methyle ester)	Carbonated Water	700 P.P.M.
		Soft Drink Concentrate	* 700 P.P.M.
3.	Acesulfame	Carbonated Water	300 P.P.M.
4.	Potassium	Soft Drink Concentrate	* 300 P.P.M.

Explanation I :- Pan flavouring material refers to the flavoring agents permitted for human consumption to be used for pan. It shall be labelled as -

"PAN FLAVOURING MATERIAL"

*Explanation II :- Maximum limit of artificial sweetener in soft drink concentrate shall be as in reconstituted beverage or in final beverage for consumption. Soft Drink concentrate label shall give clear instruction for reconstitution of products, for making final beverage.

Provided that Saccharin Sodium or aspertame (methyle ester) or Acesulfame Potassium may be sold individually as Table Top Sweetener and may contain carrier or filler articles with label declaration as provided in sub-clauses (1) and (2) of sub-rule (ZZZ) of rule 42.

(b) for sub-rule (3), the following shall be substituted, namely :-

"(3) No person shall sell table top sweetener except under label declaration as provided in clauses (1) and (2) of sub-rule (ZZZ) of rule 42;

Provided that aspertame may be marketed as a table top sweetener in tablet or granular form in moisture-proof packages and the concentration of aspertame shall not exceed 18 mg of tablet or grannule"

4. In rule 60 of the principal rules, the following shall be added at the end, namely :-

"Glycerol esters of wood resins (Ester Gum)"

5. In rule 61 of the principal rules, the following proviso shall be added at the end, namely :-

"Provided also that Diacetyl Tartaric acid esters of Mono and Diglycerides may be used in Bread and Cakes"

6. In rule 72 of the principal rules, in the Table, after serial No.10 and the entries relating thereto, the following shall be inserted, namely :-

1	2	3	4
10A	L(+) Lactic Acid (food grade)	As acidulant in miscellaneous foods	Limited by GMP.

7. For rule 72-B of the principal rules, the following shall be substituted, namely :-

"72-B-Use of Glycerol Esters of Wood Resins (Ester Gum) - The maximum limit of glycerol esters of wood resins (ester gum) when used in flavour emulsions, soft drink concentrate and carbonated water shall not exceed 100 P.P.M. of the final beverage for consumption".

8. In Appendix 'B' to the principal rules.-

(a) In item A 01.01,

(i) the words, figures and letters "Saccharin not exceeding 100 p.p.m" shall be omitted;

(ii) for the brackets and words "(expressed as quinine sulphate)", the following words shall be submitted, namely :-

"(expressed as quinine sulphate). It may also contain Saccharin Sodium not exceeding 100 ppm or Acesulfame-K not exceeding 300 ppm, or Aspertame (methyl ester) not exceeding 700 ppm".

(b) in item A. 18.14, for the words "glyceryl monostearate, albumin", the words "glyceryl monosterate, diacetyle tartaric acid ester of mono and diglycerides, albumin" shall be substituted;

(c) in item A. 26.09, under the heading "General", in clause (i), for the words "Only the vegetable oils included in these rules shall be used either singly or in combination" the following shall be substituted, namely :-

"Only the vegetable oils included in these rules shall be used either singly or in combination.

Mono and Diglycerides of edible vegetable oil may also be used as an extractant upto a maximum level of 20 percent":

(d) in item A.31.-

(i) for the words, figures and letters "starch not less than 100 ppm and not more than 150 ppm", the following shall be substituted, namely :-

"Lactic acid, butyric acid, valeric acid, cinnamon oil, and Ethyl butyrate may also be added as flavouring agent upto 0.08 per cent m/m".

(ii) after clause (vi) and before Note, the following clause shall be inserted, namely :-

"(vii) it shall contain starch not less than 100 ppm and not more than 150 ppm"

{The Gazette of India, Part II-Section 3-sub-section (i) No.206, 1997, 6-8}

174 GRAS status for menhaden oil

On June 5, FDA announced GRAS status for menhaden fish oil for food use. BASF takes the purest refined fish oil and micro-encapsulates it to form Dry n-3, a dry, free-flowing powder that is easy to use for nutritional enrichment.

The process protects the omega-3 fatty acids from degradation, and creates an ingredient mild in flavor and odor. Omega-3 fatty acids, Eicos-apentaenoic acid (EPA) and Docosahexaenoic acid (DHA) have been shown in some research studies to have health benefits such as reducing the incidence of cardiac arrest, functioning as an anti-inflammatory, enhancing immune function and inhibiting certain cancerous tumors. It also aids central nervous system and retinal development in infants. Applications for the encapsulated product are baked goods, cereal, pasta, nutritional bars and beverages and soups.

{Prepared Foods, August 1997, 68}

175 Irradiation of meat gets FDA nod

FDA has approved irradiation of fresh and frozen red meat products for controlling contamination by disease-causing microorganisms. Agency approval was based on a review of a substantial number of international studies performed to clarify the effects of irradiation on a variety of meat products. Acting FDA Administrator Michael A. Friedman says, this review found the process to be 'safe in reducing disease-causing microbes in or on meats, and that it does not compromise the nutritional quality of treated products." FDA cautions that irradiation is "not a replacement for proper food-handling practices by producers, processors, and consumers."

{Chemical & Engineering News, 8 December 1997, 17}

176 FDA Changes food norms

Milk labelling changes with the new year on Thursday with two per cent milk no longer "low fat", the US Food and Drug Administration (FDA) said on Wednesday. Also, in a move to reduce birth defects, food manufacturers are required from Thursday to add the nutrient folic acid to enriched breads, flours, corn meals, pastas, rice and other grain products. The new labelling requirement brings milk in line with other products. In 1993, the FDA defined "low fat" foods as those which have less than three grams of fat per serving. It exempted milk from this because "standards of identity" for low-fat milk were set before 1990, when Congress passed the Nutrition Labelling and Education Act. The new rule revokes that exemption.

{Economic Times, 2 January 1998, 11}

177 Drug-resistant bacteria

Evidence from Dutch turkey farms has reinforced claims that bacteria resistant to antibiotics can spread to humans from farms where animals are fed with antibiotics to make them grow faster. The new findings, published in the New England Journal of Medicine (vol. 337, p 1158), will strengthen calls for a permanent ban on avoparcin - a growth promoter manufactured by Hoffman-La Roche that has already been banned temporarily on European farms because it resembles an antibiotic.

Last Christmas the European Union suspended the use of avoparcin on the grounds that it might promote resistance to vancomycin and teicoplanin. These antibiotics are the last line of defense against methicillin-resistant

Staphylococcus aureus (MRSA), a strain of bacteria that is resistant to all other antibiotics. Because avoparcin works in the same way, bacteria that become resistant to it are likely to be equally resistant to both vancomycin and teicoplanin.

Now studies on 47 Dutch Turkey farms by Anthony van den Bogaard and Ellen Stobberingh from the department of medical microbiology at the University of Maastricht have confirmed that bacteria resistant to vancomycin are much more common in stool samples from turkeys fed with avoparcin. They also demonstrated how easy it is for these resistant strains of bacteria to infect farm personnel and, most surprisingly, people who merely live in the neighborhood of the farms.

The Dutch researchers, working with Lars Bogo Jensen at the Danish Veterinary Laboratory in Copenhagen, also used genetic fingerprinting to show that one of the farmers was infected with the same strain of vancomycin-resistant enterococci as his turkey. They say this proves that the farmer must have caught the infection from the turkey.
{New Scientist, 6 December 1997, 5}

178 Tomato and health

The buzzword of a few years ago was beta carotene, a substance found in fruits and vegetables that was supposed to protect against cancer. Now it seems another substance in fruits and vegetables may account for the health protection long associated with eating carotene-rich foods.

It is called lycopene and it is what makes tomatoes red. It had previously been strongly linked to a reduced risk of developing various deadly cancers, including those of the prostate, colon and rectum.

Like beta carotene, lycopene is fat soluble. Dietary fat is needed for it to be absorbed through the intestines, and the amount stored in body fat is considered a reliable reflection of how much people absorb from their diets. Lycopene's protective role, however, stems from its ability as a potent anti-oxidant, which means it can prevent free radical damage to cells, molecules and genes as it circulates in the blood. Free radicals are highly reactive molecules that can combine with other substances and change them in a harmful way.

Such damage can, for example, transform freely circulating cholesterol into a form that sticks to arteries and clogs them, setting the stage for a heart attack. It can cause genetic changes that may in time result in cancer. Free radical damage is also involved in cataracts caused by exposure to sunlight and lung disease caused by inhaling pollutants like ozone. Lenore Kohlmeier, a professor of epidemiology and nutrition at the University of North Carolina at Chapel Hill, and her colleagues at 10 European medical centres published the findings in The American Journal of Epidemiology. They indicate that lycopene is most likely to be the substance responsible for the protection against heart disease and cancer that had long been thought to result from consuming beta carotene.

Lycopene is most prominent in tomatoes. But it is not well absorbed into the body unless the tomatoes are cooked. Thus, the best sources are concentrated, processed tomato products like tomato

paste, ketchup and tomato sauce. Tomato juice is a reasonably good source if it has been heated, as would occur when it is canned or bottled. Other sources of lycopene include watermelon, red grape fruit and, to a lesser extent, shellfish like lobster and crab.

"Once again we have to revise an old recommendation - to eat fresh fruits and vegetables," Dr Kohlmeier said in an interview. "You get five times more lycopene from tomato sauce that you would get from the equivalent amount of fresh tomatoes." Further, she said, when tomatoes are consumed as part of a processed food, that food is likely to contain some fat that makes it possible for the lycopene to be absorbed. When the research team simultaneously examined levels in body fat of lycopene, alpha and beta carotene and lutein, another carotenoid, lycopene alone seemed to account for the reduced risk of heart disease.

Dr. Kohlmeier cautioned against assuming, first, that the protection the researchers observed resulted directly from lycopene and not some other as yet unknown nutrient that 'travels with lycopene' and, second, that if lycopene is in fact protective, the same benefit can be gained from taking it in pill or powder form, instead of getting it from food.
{The Times of India, 6 January 1998, 13}

NEW INDUSTRIES AND COMPANY NEWS

179 Champion Packaging sets up nylon unit

Champion Packaging Industries Pvt. Ltd. has set up a packaging unit here to produce co-extruded Nylon-based three layer film for packaging food products such as oil and ghee.

Mr. Vikas Bachhawat, Director, told that such a packaging unit was the first of its kind in the country. "Generally in packaging, five-layer nylon is used. We are the first company to make use of three-layer nylon. The biggest advantage for our clients in this is the cost saving." he said. While a five-layer nylon costs Rs.140 per kg, excluding levies, three layer costs Rs.120 plus taxes for the same quantity, though printing quality remains the same. Another advantage, according to Mr.Bachhaawat, is the saving on overhead costs. "While on the one hand the power consumption is lower, on the other, the investment in plant is also considerably less. The machinery can produce 60 tonnes a month.
{Business Line, 18 February 1998, 5}

180 PET bottle plant

Mangaly Industries Pvt. Ltd. is setting up a 2,400 - bottle per hour PET bottle plant at the Dobaspet Industrial Area near Bangalore to meet the increased demand from the soft drink giant, Pepsi.

The new location will not only save on transport costs, but would also provide better economies of scale. The new project is slated to be completed before April 30. The total project cost of the new venture is estimated at Rs.3.12 crores.
{Business Line, 28 February 1998, 5}

181 Godrej Pillsbury to set up facility in India

Godrej Pillsbury Ltd., a joint venture between Godrej Foods Ltd and Pillsbury, part of the Grand Metropolitan of the UK, has announced its plans of setting up a manufacturing facility in India. Pillsbury is one of the world's leading food companies whose product segment ranges from baking and speciality products, prepared dough products to frozen pizza and micro-wave snack products. At present, the company meets its requirements by importing products directly from the U'S.

Meanwhile, the company has recently launched branded cake mixes in India. These and other products which would follow in future will be manufactured in India.

(Chemical Products Finder, February 1998, 109)

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